



CHEMICAL STOCKPILE DISPOSAL IN THE RUSSIAN FEDERATION



RCB DEFENSE TROOPS:
PRACTICAL
IMPLEMENTATION
OF OPTIMAL
AND ENVIRONMENTALLY
SAFE
SOLUTIONS
TO THE PROBLEM



The fourth public hearing on the problem of chemical weapons destruction



Проходят общественные слушания
Public hearings are being held



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Stanislav Petrov

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Signing documents at the conference in The Hague (S. Petrov in the center)

“CHEMICAL STOCKPILE DISPOSAL: A NATIONAL PROBLEM AND OBLIGATIONS IMPOSED BY THE CONVENTION”

With great integrity, this country has joined with the international community in working toward the total rejection of all types of weapons of mass destruction, including chemical weapons. The Russian Federation (RF) President's decree, "On the Structure of Federal Executive Authorities," created a federal executive agency that was intended to coordinate effectively all efforts by the ministries and agencies toward achieving the goal of chemical weapons destruction in Russia.

Chemical weapons destruction (CWD) is a total, multifaceted, and extremely sophisticated task. It requires objective and parallel solutions to the technical, design, construction, and operating tasks, with due consideration given to complete technological and ecological safety, population screening, provisions for protective facilities, etc. The total cost involved in the RF's chemical weapons destruction is believed to be 32.75 billion rubles. Currently, the RF's Ministry of Defense serves as the government's client for all tasks involved in program implementation. This practice of government involvement is widespread in most of the foreign countries that have chemical weapons because, objectively, this approach is the most reliable way of providing for all types of safety in storage and destruction, effective and coordinated efforts, and a high level of competence in the implementation of the program.

The RF government has adopted a federal goal-oriented program: "Chemical Stockpile Disposal in the Russian Federa-

tion." Because of the program's high priority, it was assigned the status of a Presidential Program. The Department of the Chief of the RCB Defense Troops of RF MOD (RCBDCOM MOD RF) is named in the program as being responsible for the most important task: playing a major role in preparing for the destruction of chemical weapons. To accomplish this task, the Chief of the Department of Troops ("Department") established a special unit that, in close cooperation with the ministries and agencies specified in the program, is working on introducing ecologically safe and harmless technologies, creating a production basis for the destruction of chemical weapons, etc. On this basis and in conjunction with the above-mentioned agencies, a Program Directorate has been established and is now functioning.

The program envisions the step-by-step (staged) destruction of chemical weapons at their storage sites. Top priority is given to destroying the chemical blister agents and their mixtures (7.5 thousand tons). The next stage will be devoted to destroying chemical munitions that contain organophosphorus agents (32.5 thousand tons of agents alone). Seven chemical weapons destruction facilities will be built in six regions of the country and will include complex chemical production facilities with waste storage sites.

The RCBDCOM RF MOD is very active in developing a legal basis for chemical weapons destruction because the legal protection of the welfare of the residents living near the chemical weapons destruction facilities is a major prerequisite for the successful solution to the problem. In spring 1997, the country's parliament adopted a federal law, "On Chemical Weapons Destruction," that defines the chief priority of the program: the safety and ecological cleanliness of the chemical weapons destruction process.

Therefore, of particular importance is the selection of the best destruction technology, a factor that defines all further efforts. Chemical agents in the RF are destroyed using a domestically produced two-stage method. A technology based on this method reliably ensures the safety of the CW destruction process.

It must be emphasized that the RCB Defense Troop specialists have gained valuable experience by creating a full-size industrial facility on the basis of the two-stage method. Designed and built near Chapayevsk, this facility will become an active RF MOD specialist training center (STC) for the chemical weapons destruction facilities in Russia. In the near future, an RF government resolution is anticipated to approve the regulations for the STC, giving it the status of a national training center to ensure strict, independent government monitoring and full disclosure of all of its operations to the general public.

Chemical weapons destruction has a tremendous international significance. In November 1997, Russia ratified a Convention prohibiting the development, production, stockpiling, and use of chemical weapons and mandated their destruction. This Convention furthers the goals of the country's national security because without it the global proliferation of chemical weapons cannot be prevented. Because Russia has joined the Convention, it is a full-fledged participant in forming an international monitoring system and in shaping the decision-making process, thus ensuring the unconditional performance of all of its member states.

Participation in the Convention also corresponds with the internal interests of the country. The production of chemical weapons was halted in Russia in 1987; consequently, even the "freshest" portion of the stockpile is more than 10 years old. Great anxiety is caused by a concern for the safety of the blister agent stockpile, which is stored in large, stationary vessels built in the 1950s. The chemical weapons stockpiles cannot be stored forever; only their disposal can guarantee the ultimate safety of the population and the environment and can remove the social and psychological tension in areas near the chemical weapons storage sites.

Because of the high costs of CWD, the Program Directorate and the RF's Ministry for Foreign Affairs have already enlisted the cooperation of the US, Germany, Italy, the Netherlands, Sweden, Finland, and other



A selected sample of munitions about to be subjected to destruction

European countries capable of reducing our chemical weapons destruction facility expenditures. The US is offering very specific assistance to us in designing and constructing a chemical weapons destruction facility at Shchuch'ye, Kurgan Region. Germany is delivering a portion of the equipment for the Gorny facility in the Saratov Region.

At an international conference held in The Hague on May 18, 1998 (aimed at assisting Russia in solving its chemical weapons problem), this cooperation gained a new impetus. The conference was attended by delegations from practically all NATO nations and the EU, as well as by representatives from Argentina, Brazil, Chile, and New Zealand. France and the UK expressly stated their intentions to provide concrete financial assistance.

One must bear in mind that the Russian budget continues to be the main source of funds for the disposal of our chemical weapons. According to our experts, the total amount of money coming from our foreign partners would not exceed 5% of the total costs involved in chemical weapons destruction in this country.

Article 2 of the federal law ratifying the Convention ("On the prohibition of the development, production, stockpiling, and use of chemical weapons and on their destruction") states that the President of the RF assigns, in compliance with the Convention, all deadlines for the destruction of chemical weapons, with due consideration given to the economic situation in the Russian Federation and the need to use the safest technologies for

chemical weapons destruction. This provision in the law convincingly demonstrates the reasonableness and utmost responsibility with which Russia is approaching a solution to the problem of chemical weapons destruction.

The RCB Defense Troops of the RF MOD, as the federal client, possesses a system for CWD management and implementation, all of the necessary intellectual and institutional resources, a research and technological base, and trained personnel.

Today, we cannot be blamed for the slow implementation of the CW destruction program. Such criticism is unreasonable if we analyze the dynamics of the actual financing. It is sufficient to cite the figures for the past and current years: in 1997, the program planned to allocate 3,520,800 thousand (denominated) rubles; the government order for defense purposes approved only 4.7% of that amount (or 146,500 thousand rubles), but only 82,424 thousand (or 2.3%) was actually allocated. In 1998, the program set aside 1,701,333 thousand rubles for the first 5 months, but the actual allocation was 0.9% of that sum (39,492 thousand rubles)!

Yet, because of the truly selfless and creative efforts of the people directly involved in the implementation of the program, work is being done on virtually every aspect of chemical weapons destruction, although there are delays of up to 2 to 2.5 years.

The high level of the expertise of the specialists working for the RCB Defense Troops of the RF MOD in the field of chemical weapons destruction is confirmed by the fact that, beginning in 1997, Russia has been using both the Saratov Military Engineers' Academy of Chemical Defense and the STC in Chapayevsk as its bases to train international inspectors—experts from many countries who ensure compliance with the monitoring provisions of the Convention.

* * *

Mobile complex for chemical weapons destruction





Valery Kapashin

Director, Federal Goal-oriented Program "Chemical Stockpile Disposal in the RF"

Deputy Chief of RCB Defense Troops of RF MOD, Lieutenant General



Coordination meeting
(V. Kapashin in the center)

**"HIGHEST
PROFESSIONALISM
OF PERSONNEL
EQUALS SUCCESS
AND SAFETY"**

One of the major components of a country's structural and functional system for the destruction of chemical weapons (CWD) is its recruitment and training process.

The Department for Chemical Weapons Destruction (the chief structural unit of RCBDCOM RF MOD, which is responsible for the implementation of the CWD program) is staffed with officers who gained experience during the construction of the first stationary facility that perfected the CWD technologies at Chapayevsk, Samara Region. These officers have practical experience in dealing with actual chemical agents and have worked at research and development facilities and testing grounds. It must also be added that more than one-third of these officers had a direct role in disposing of the aftereffects of the Chernobyl nuclear plant disaster.

Organizing the training for personnel is also of major importance. Training the specialists in CWD at higher civilian schools is currently not possible for a number of reasons, including:

- Lack of lecturers with practical experience in working with actual chemical agents (CA) and highly toxic substances and lack of experience in eliminating the results of accidents at chemically hazardous facilities.
- Lack of a laboratory and educational facilities that can be adapted to solve tasks involved with chemical weapons destruction.

- Lack of available specialized classes and programs that have been reviewed in detail, tested, and approved; that have received the necessary approvals by the proper authorities; and that have been adopted by all authorities—and also ensuring the high quality and level of professional training and education.
- The remoteness of the facilities that will store and destroy CW and their great distance from major populated areas require additional expenditures to staff the facilities with highly professional civilian personnel.

As a result of an analysis of these and other factors and considering the significance and complexity of the tasks specified by the Convention, the RF government has issued a resolution to prepare and implement the steps involved in fulfilling its international obligations. The RF Ministry of Defense (represented by the RCBDCOM) has been authorized to establish jointly with the agencies concerned a personnel training system for the operation of CW storage and destruction facilities, as well as other tasks aimed at chemical disarmament.

The resolution requested that engineering and technical personnel be trained at the upper-level schools of the RF MOD. The Military Chemical Defense Academy (MCDA) prepares specialists from the high military engineering command, and the Saratov Military Engineers' Academy of Chemical Defense graduates military engineers and civilian personnel. This training includes theoretical studies under a special program that includes the advanced study of chemistry and chemical weapons destruction processes and technologies; it also provides its students with hands-on experience using the equipment from its theoretical and training center.

Graduates of the Saratov Academy are being trained to work at seven CWD facilities being built in six regions of the country. Simultaneously, in the course of their studies, these students have already become fully aware of the significance of the stated task to implement the federal goal-oriented program; they are aware of their own role in this task and are preparing to perform functional tasks at the actual facilities.

The training process at the Saratov Academy features new classes and programs that offer a logical and systems approach to creating an educational process, continuity of education, and the use of advanced training methods and facilities. The classes and programs place particular emphasis on special training and a detailed examination of safety and environmental protection. The curriculum is created according to government requirements for compulsory minimum scope and training level of engineers.

The Saratov Academy currently possesses strong scientific and educational potential, well-prepared engineering and technical personnel, and modern training and laboratory equipment. Over one-third of its lecturers have a scientific degree, and 46 doctors of science also teach at the academy. These highly qualified individuals are capable of solving sophisticated scientific and academic problems.

Thus, the training system incorporates several levels of personnel:

- Senior commanding and engineering officers (Military Chemical Defense Academy)
- Commanding and engineering staff (Saratov Military Engineers' Academy of Chemical Defense)
- Capable technical personnel [RF MOD Center that trains specialists for the RF chemical weapons destruction facilities—Specialist Training Center (STC)]

Both the MCDA and the Saratov Academy offer theoretical and practical training of its specialists, as well as the practical application at the STC (Chapayevsk, Samara region) using inert media and practical work with chemical agents on leading pilot installations of the State Organic Synthesis Technology Institute (GITOS, at Shikhany, Saratov Region).



A class at the Saratov Academy

- First-aid and self-aid measures to be taken in case of an accident
- Operation of production waste incineration equipment and stack gas purification

Since early 1996, cadets and students of these advanced military schools have been training and receiving hands-on experience at the STC.

This type of educational system is generally capable of solving the task of preparing specialists for chemical weapons destruction, and this fact has been confirmed by a commission of the international organization for the banning of chemical weapons, which reviewed the Saratov Academy and recommended it as a model for training the international inspectors. Since 1997, the Saratov Academy and the STC have been offering courses for candidate international inspectors for the Organization for the Prohibition of Chemical Weapons (OPCW, The Hague, The Netherlands). Plans are now being made for the specialists currently attending lectures at the MCDA to be trained to accompany international inspection groups on the OPCW mission.

The existing system should be considered as an essential practical and political contribution of the Russian Federation toward the actual implementation of the provisions of the Convention for Chemical Weapons Prohibition.

* * *

The training process at the STC is built around the use of special process equipment and technologies at the training facilities, which are very similar to the equipment and technologies to be used at the facilities intended to eliminate the organophosphorus CAs.

Well-trained technical personnel who have gained experience at similar facilities are required to operate this type of process equipment and to ensure the stable functioning of the water and air protection systems that ensure the ecological safety of the industrial facilities involved in CWD. Therefore, it was reasonable to use the STC's educational and training center for the day-to-day training of civilian specialists in order to teach them how to operate the process equipment with simulants and offer them the professional skills and knowledge of the safety rules required to operate at industrial facilities. The educational and training center of the STC offers the following training curriculum:

- Organization of buffer storage of chemical munitions intended for destruction (using mockups)
- Air monitoring of storage areas
- Preparation of chemical munitions (mockups) for destruction
- Destruction of chemical warfare agents and thermal treatment of munition casings
- Environmental protection of the industrial zone
- Production management
- Operation of management and computer facilities

- Operation of closed-circuit television
- Operation of sampling and analyzing equipment
- Training in safety measures applicable to chemical laboratories
- Operation of equipment used to accumulate, prepare, and store reagents and wastewater
- Acquisition of skills required to observe safety measures while working with chemical munitions

Training civilian specialists at the Specialist Training Center in Chapayevsk





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“RUSSIAN TECHNOLOGIES FOR CHEMICAL WEAPONS DISPOSAL: PERSPECTIVES AND REALITY”

The development of the chemical agent destruction technologies is one of the most important stages in actually preparing for the destruction of chemical weapons. In compliance with the requirements of the multilateral Convention that bans chemical weapons (CW), each member nation will define its own acceptable method for CW destruction, but the selected method must be implemented at the most technologically advanced facilities that are built in specially allocated territories. CW cannot be destroyed by dumping them in water reservoirs, burying them underground, or incinerating them in the open air.

The destruction methods that are developed must have a built-in procedure ensuring that the highly toxic chemical products (and the facilities for their destruction) will be irreversibly converted into a state that prevents their further application. A solution to this problem is technologically complex and requires the involvement of large-scale industrial facilities. The solution will be based on highly efficient technologies that can be used for other domestic tasks after the CW have been destroyed. Undoubtedly, the main criterion in selecting the optimal destruction technology is environmental safety.

The status of such technologies—and the primary goals in developing them—are highlighted by the mass media, scientific proceedings, and journals, as well as at international science conferences and workshops.

Since 1989, most CW destruction methods and technologies have undergone a multifaceted scrutiny. Choosing a technology for experimental testing involved an analysis of both domestic and international achievements in the field of CW destruction technologies.

The CW destruction technologies now under development were verified on a comparative basis in 1992, 1994, and 1995. These technologies were reviewed by a wide range of specialists in various fields (including process engineers, engineering personnel, ecologists, and medical workers) and with representatives of supervising and local authorities. These discussions involved various CW destruction alternatives using both chemical methods and others (thermal, electrochemical, and biological).

The technology was selected according to the following criteria: safety, noncontamination, technical soundness, resource availability, economic feasibility, and the reliability of the technical processes with respect to working with actual chemical agents (CA). The review revealed that these criteria were met by a two-stage technology based on the chemical detoxification of chemical agent. The proprietor of this technology is GosNIIOKhT, the leading research institute in the field of CW destruction technologies. GosNIIOKhT has vast experience in handling CA, has performed the required research, and has the necessary experimental facilities and trained personnel. The technology has passed all the necessary stages of testing (using actual CW samples) and ensures a total solution to the CW destruction problem, ranging from the demilitarization of CA-filled munitions (containers) to the reuse of all types of waste. Maximum safety is achievable through its two-stage sequential process.

During the first stage, chemical reagents convert the CW (sarin, soman, VX, mustard, and mustard-Lewisite mixtures) under “soft” controllable conditions into nontoxic products that can be reused. The process operates in a periodic mode: each cycle handles an optimized, limited quantity of CA that is capable of localizing any potential accident. Also during this stage, the chemical munitions casings are decontaminated and processed thermally after demilitarization.

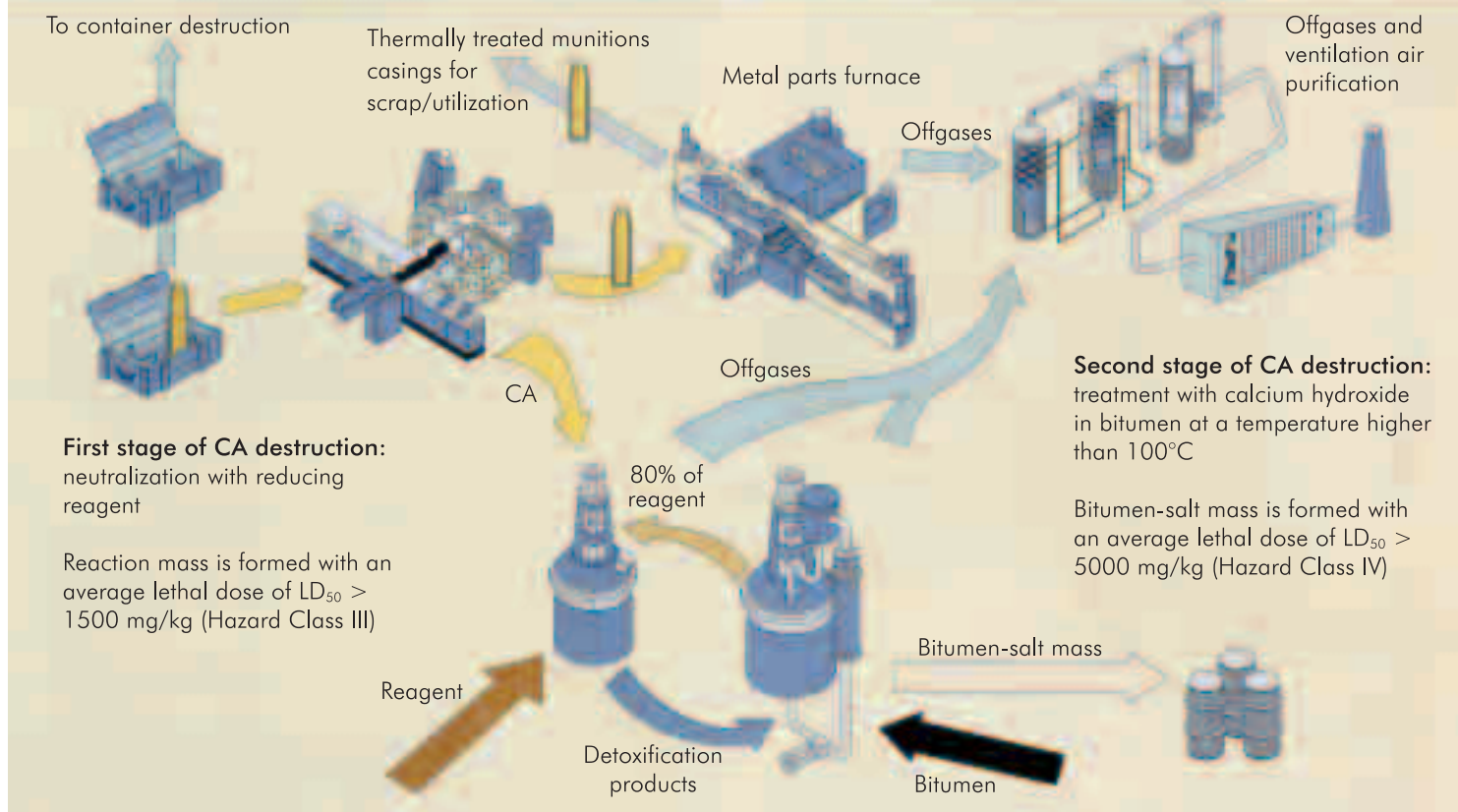
During the second stage, the reaction masses are processed for further use. Thus, because of the sequential nature of this process, the so-called “dual protection” guarantees the completeness of detoxification and the safety of the technological process.

In 1995, an international experiment was staged to verify the effectiveness of the Russian two-stage technology for the destruction of organophosphorus chemical agent. The results confirmed the validity of the decision in favor of the two-stage technology and its industrial use in Russia. The technology had passed international inspection.

To destroy Lewisite, two alternative technologies will be used that recover the arsenic produced from the process of destroying Lewisite: the first is a two-stage alkaline hydrolysis-electrolysis technology offered by



Chemical Weapons Two-stage Destruction Diagram



GosNIIOKhT and the second is a single-stage ammonia reduction technology sponsored by Nizhni Novgorod State University. Currently, these technologies are near completion and, with the mustard and mustard-Lewisite mixture destruction technologies, will soon be implemented at the CW destruction facility at Gorny.

A single-stage technology developed by AOOT NITS Khimprom (Volgograd) is planned to be used to eliminate the organophosphorus chemical munitions for projectiles and rockets (with a capacity of up to 8 liters). The essence of this technology is that the organophosphorus chemical agent is thermally decomposed within the casing of the chemical munition. The gas products of this reaction are further burned through a hot catalyst.

To destroy leaking aviation and artillery munitions and tactical rockets filled with the nerve agents of sarin, soman and VX, the CW arsenals are equipped with mobile systems for the destruction of these chemical weapons (see photo on Page 3). The CW destruction technology is based on a process that thermochemically neutralizes the CA and subsequently burns the detoxified products of this neutralization down to the inorganic compounds. Work is nearing completion on developing a purification system for the offgases produced at the CW destruction

facilities in order to ensure the ecological safety of the process.

* * *

Technical equipment for chemical weapons destruction developed by Russian specialists (the realization of the two-stage technology developed by GosNIIOKhT)





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Colonel**



**“RUSSIAN
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One of the principal elements in the first stage of building a chemical weapons destruction facility in the Russian Federation (RF) is preparing for design and construction. According to applicable RF laws and regulations, the engineering process begins with the execution of a government resolution, the adoption of a program, or the issuance of a Presidential decree stating the need to set up a facility. On this basis, the client (RCBDCOM MOD RF) submits a declaration of intent to the regional authorities where the facility will be built. The contractor then issues the Terms of Reference to the engineering and

design organizations who are responsible for developing the Justification of Investment (JOI) that will serve as the basis for the construction of a chemical weapons destruction (CWD) facility, having first obtained a positive response from the local authorities. However, the issuance of the Terms of Reference is preceded by the review and collection of baseline data and technical conditions. The materials thus prepared are sent to a commission: for agreement, expert review, and confirmation. Thereupon, a commission selects a plot of land and a feasibility (design) study is prepared in accordance with the respective process of agreement, expert review, and confirmation. After the right-of-way is assigned, detailed documentation is prepared, permission is obtained, and construction begins. On the average, engineering preparation takes a minimum of 3 years. The technical section of the operating and construction department is the contractor unit that is responsible for engineering preparation. Together with the CWD discipline specialists, this unit organizes and develops the cost estimate documents. The best design institutes in the country are called upon to develop the design documentation because they are experienced in both the technological aspects of the project and in the construction of the infrastructure and its surrounding facilities.

The 31st State Design Institute for Special Construction of the RF MOD (31 GPI SSRF MOD, Moscow) performs the necessary engineering tasks for housing, social infrastructure, and communications to provide the operation of the chemical weapons destruction facility. In its work on CWD facilities, the institute relies on its extensive experience in designing military complexes for strategic missile troops, constructing stand-alone military settlements, and providing engineering support for such facilities.

The Institute for the Design of Organic Synthesis Production Facilities (Giprosintez, in Volgograd) develops technological sections for the chemical weapons destruction facilities and is extremely knowledgeable in designing and supporting the construction of major facilities and complexes for chemical production, especially the production facilities under the auspices of the defense order of the country. Giprosintez functions as a general contractor.

From 1986 to 1989, in accordance with the federal government decision, these two engineering and design institutes worked in the area of Chapayevsk, Kuibyshev region, and the contractor (MOD) built the first pilot factory for chemical weapons destruction. The facility is currently being used as a center for training CWD specialists.

It is necessary to emphasize that the exchange of CWD expertise with specialists from foreign countries has shown that the technological process for the detoxification and destruction of chemical agents in the

The facility in Chapoyevsk





The CWD facility near the Gorny Settlement

RF incorporates a number of extraordinary solutions capable of increasing the reliability and safety of the chemical weapons destruction technological process.

In later years while in the process of preparing (and in particular, in adopting) the federal goal-oriented program ("Chemical Stockpile Disposal in the Russian Federation" and the federal laws "On Chemical Weapons Destruction" and "On Ratification of the Convention on the Prohibition of the Development, Production, Stockpiling, and Use of Chemical Weapons and on Their Destruction"), large-scale and comprehensive engineering and design work was agreed to, with very definite deadlines imposed on all tasks. However, the insufficient allocation of money for the CWD program resulted in a delay of more than 3 years.

Under the current situation, a new solution that is capable of reducing the construction time and saving funds is the agreement of the RF State Committee for Construction to change the procedure for designing a CWD facility by excluding the predesign stage of the JOI. The development of design documentation and cost estimates can now be performed in two stages:

- Feasibility study (design) of construction effort
- Detailed documentation

This revised procedure offered a new perspective on the work already performed to map out ways for speeding up the resultant process.

To begin work on the large-scale task of building seven facilities in six regions of the RF, two additional technological engineering institutes were appointed: (1) Sojuzpromnii-project (Moscow), which has 70 years to its credit of designing facilities for potentially hazardous munitions, including sites involved in the production, utilization, and destruction of military technologies containing inflammable and highly toxic chemical substances; (2) The State Institute for Applied Chemistry (GIPKh) (St. Petersburg), which has designed a number of major facilities for the chemical industry.

Two design institutes of the RF MOD were also appointed: (1) Togliatti Design and Survey Institute, with its vast experience in the development of design documentation and cost estimates for the construction and rehabilitation of construction, automobile manufacturing, woodworking, and other industrial facilities; (2) The 23rd State Navy Design Institute, which is famous for its design and construction of major defense complexes and social/engineering infrastructure facilities.

The appointment of these new design institutes was helpful in organizing parallel work on designating sites for the CWD facilities in all regions. The participation of these institutes ensured the adoption of the most efficient decisions (with respect to the facility as a whole), ranging from securing optimum site locations, to being able to switch to other tasks, to deciding on a single complex for waste treatment.

In response to proposals sponsored by the regions involved, the RF government adopted a resolution (No. 402, dated April 17, 1998) allowing the standard procedure to be bypassed in order to perform priority tasks (using detailed interim drawings and cost estimates) that were involved in building premises, structures, engineering utilities, and social infrastructure facilities before the approval of the feasibility study for the intended chemical weapons destruction facilities. This solution will provide local residents with the much-needed priority development of the social infrastructure of the regions hosting the chemical weapons destruction facilities.

It must be stressed that the general contractor (Giprosintez) has been very specific in requiring that this approach be maintained. Despite the extreme shortages of money, the RCBDCOM MOD RF, jointly with regional contractors, in 1997-1998 alone was able to build and had prepared for acceptance (in the

Saratov region, Krasnopartizansky area, Gorny settlement) a group of eight apartments, 17 family houses in the Oktyabrsky settlement, a gas pipeline, and a high-tension power line. Work is now under way on building a new settlement for 500 family houses, complete with all the necessary infrastructure. By the end of 1998, more than 50 houses will have been finished at the Mikhailovsky settlement, water mains will have been completed to link the Irgyz River with the Gorny settlement, and other engineering projects belonging to the social infrastructure will have begun, including the continuation of work on the Oktyabrsky-Gorny-Berezovo highway. This highway features two bridges crossing the Irgyz and Sakma Rivers, thus substantially improving the communication between the Krasnopartizansky area and the rest of the region, particularly during high floods, autumn rains, and spring thaws. Similar construction will begin in Udmurtia (near the town of Kambarka) where a group of 60 apartments, a hostel, a city water main, and gas mains are under construction. Other regions will soon be involved in the construction effort.

Today, the efforts of hundreds of designers and thousands of construction engineers who were invited to work on these priority projects are all merging into one consolidated effort. Engineering ideas, which originated on paper, are now being realized in the form of housing, social and communal projects, roads, engineering networks, and, with time, major advanced and ecologically safe industrial complexes aimed at destroying chemical weapons—that abhorrent monster of the 20th century!

* * *

Facilities of the social infrastructure





Vladimir Ulyanov

**Deputy Chief of Chemical Weapons
Destruction Department RCBDCOM
MOD RF
Major General**



All possible scenarios are taken into consideration

**“STORE . . .
DANGEROUS . . .
DESTROY:
TO ASSIGN SAFETY
PRIORITIES THAT
ARE REASONABLE
AND SERIOUS”**

Among the many problems involved with chemical disarmament is the issue of safety of the population and the environment, which is given special importance. This is the most sensitive problem for all levels of the population, and it continues to be the most important to the public, including the international community.

The concept of safety when applied to the disposal of the chemical stockpiles has two issues: ecological safety and accident-related safety. These two elements reflect the prevention of hazards that differ according to time and the scale of the impact. Thus, the first type of hazard can manifest itself as the impact of chemical

agents (CA), chemical reagents used in the technological processes, reaction masses, and gas emissions. Accident-related hazards above all create the so-called peak loads. Both aspects of the safety problem are considered when developing a safety system for chemical weapons storage and destruction.

The safety problem of chemical weapons (CW) storage and destruction applies to (or indirectly affects) almost all of the existing and future documents connected with chemical disarmament. It is necessary to exclude (or reasonably minimize) even the remote possibility of danger connected with the impact of chemical agents and detoxification products on human health and the environment.

Safety issues involved in the destruction of accumulated CW stockpiles have long become cross-border topics and are the subject of concern and anxiety for other countries, particularly those in the vicinity of the CW storage and destruction facilities. Under such conditions, both national and international guarantees are required to ensure the safety of accepted destruction methods, the irreversible nature of the CA detoxification processes, and the reliability of monitoring the overall stages of CW destruction.

The safety of chemical weapons storage is understood by specialists to include the concepts of chemical weapons storage facilities and their monitoring systems, which minimize the possibility of events causing hazardous consequences for the population and the environment. One of the most important requirements that is to be met by the chemical weapons storage and destruction facilities is the safety of the chemical weapons destruction facility personnel, the population living around the facility, and the environment. Table 1 shows the location and distribution of the chemical agents.

The total amount of CA stockpiles in Russia is approximately 40,000 tons:

- Organophosphorus CA (sarin, soman, VX) – 32,500 tons
- Mustard, Lewisite, and their mixtures – 7,500 tons
- Phosgene – 5 tons

Chemical stockpiles are stored at specially designed facilities (arsenals) that function primarily to ensure safety. The arsenals are equipped with special technical systems and alarm equipment that prevent unauthorized access to the facility. Special storage facilities equipped with these systems and equipment ensure reliable protection of the stockpiles from any outside impact. Table 2 shows the distribution of agent by the type of storage.

Using a computerized system, the air in the storage facilities is monitored continuously (on a 24-hour basis) against any contamination by CA. In addition, after a storage facility is opened, the air is monitored

Table 1

CW Distribution by Chemical Agent Type and Storage Facility					
Pochep town, Bryansk Region	VX	Sarin	Soman		18.8% of total stockpile
Maradykovsky settlement, Kirov Region	VX	Sarin	Soman	Mustard/Lewisite mixture	17.4% of total stockpile
Leonidovka settlement, Penza Region	VX	Sarin	Soman		17.2% of total stockpile
Shchuch'ye town, Kurgan Region	VX	Sarin	Soman	Phosgene	13.6% of total stockpile
Kizner settlement, Udmurt Republic	VX	Sarin	Soman	Lewisite	14.2% of total stockpile
Kambarka town, Udmurt Republic	Lewisite				15.9% of total stockpile
Gorny settlement, Saratov Region	Mustard	Lewisite	Mustard/Lewisite mixture		2.9% of total stockpile

Table 2

CW Stockpile Distribution by Storage Type							
	VX	Sarin	Soman	Lewisite	Mustard	Mustard/Lewisite mixture	Phosgene
In munitions and devices	100%	100%	100%	10%		2%	100%
In containers				90%	100%	98%	

using CA detector kits. This double monitoring of the air substantially increases the probability of detecting even trace amounts of chemical agent, thus providing for the safety of the personnel.

Chemical munitions are stored without fuzes or burster chargers and are in a location that is very convenient for systematic visual inspection. Munitions that have a potential to leak are coated with a special detector paint that changes color when it comes in contact with CA, thus enabling the timely identification of a “leaker.”

To drain the leakers, storage facilities are equipped with specially sealed containers that isolate the leaking CA from the environment

and ensure the short-term safe storage and destruction of the leakers.

The task of ensuring CW storage and destruction safety is addressed by using a total systems approach with consideration given to all aspects of the problem. Measures to improve CW storage and destruction safety are interrelated and depend on the time and site being used. Hence, there is the requirement for a systems approach to safety. One must point out that all elements of the safety system are interrelated and interact. Therefore, only the total development of all elements of the safety system will guarantee the safety of CW storage and destruction. This fundamental principle has been built into the systems approach and has

been observed continuously in the course of implementing the predesign and design tasks involved in the construction of a chemical weapons destruction facility.

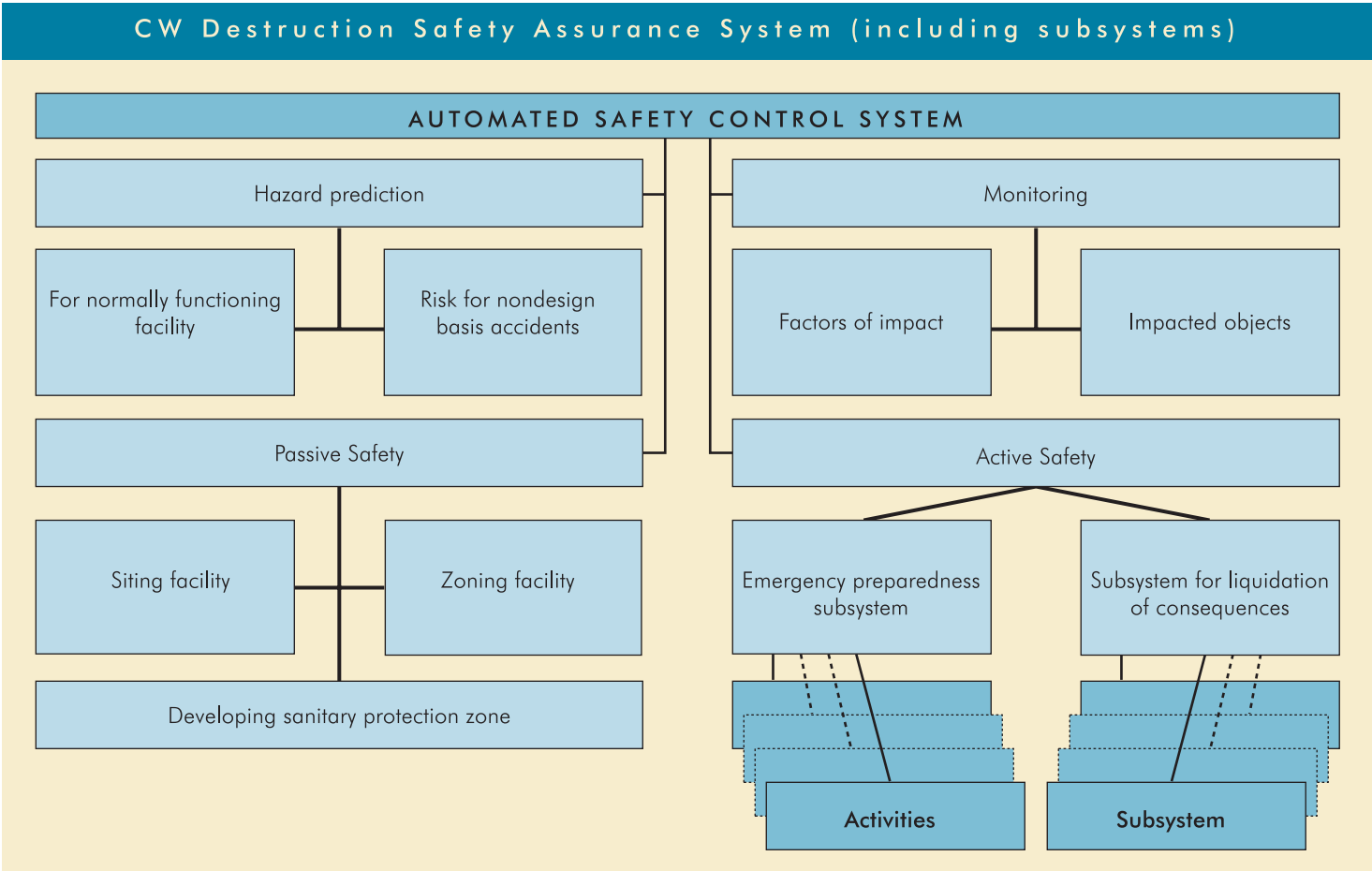
CW Storage and Destruction Safety Assurance System

A CW storage and destruction safety assurance system is a hierarchy of steps, the implementation of which minimizes the negative factors accompanying, or emerging from, the CW storage and destruction processes. Table 3 shows a conceptual model of a general CW storage and destruction safety assurance system.

The CW destruction safety assurance system is based on the interaction of the following subsystems:

- CW destruction safety assurance management (using an automated safety assurance system)
- Risk evaluation
- Monitoring the factors and the consequences of an impact
- Passive safety
- Active safety

Table 3





Regular inspection of the thickness of a container filled with CA

and the quantitative/qualitative composition of emissions and discharges. Moreover, the composition of the monitoring system includes the technical facilities and institutional structures necessary to evaluate the deviation factors of the health of the personnel, the general population, and the status of the environment.

An **active safety subsystem** includes the following components:

- Readiness for emergency
- Liquidation of consequences

The population must be protected from any impact during an emergency situation, whether it be from natural or manmade calamities. A special organization has been created for the interaction of the Russian Ministry of Defense (MOD) and the Ministry for Emergencies (both vertically and horizontally—within their organizational structures). This organization works in conjunction with the functional elements of the local sectors that also participate because the Ministry of Emergencies is part of Russia's nationwide system of action in an emergency situation (ES).

The protection of the population in an emergency is based on the following basic principles: continuity, timeliness, and flexibility of management in an ES; ability to produce a prompt response to a changing situation; timeliness and completeness of steps being taken in response to an ES; comprehensive protection of the entire population; continued readiness of voluntary groups to perform their tasks; concentration of efforts to protect the population's life support systems; and elimination of the consequences of an ES.

One of the most important issues in protecting the population is that of having the population be able to become adapted psychologically to the problem. Toward this end, work is being carried out with the residents through public hearings and leaflets, instructions, and other visual aids.

In conclusion, it is important to stress that the set of systems used to ensure the safety of CW storage and destruction is actually being used at all RF arsenals because it offers reliable protection for the population and the environment. This aspect is a priority in the operations of the RCB Defense Troops of the RF MOD aimed at implementing Russia's Chemical Stockpile Disposal Program.

* * *

A **passive safety subsystem** considers the requirements of a site for a potentially hazardous facility in a region, the zoning of the facility (and its subdivision into an industrial/technical zone and a residential area), the siting of the residential area with regard to the weather and topography, and the establishing and developing of a clean zone.

To control the safety assurance process, a special two-part **monitoring subsystem** will be provided; the first part will monitor the factors creating an impact and the second will monitor the object of the impact. The first subsystem will permit a qualitative and quantitative assessment of the air, soil, and water pollution. The second subsystem will assess the status of the health of the personnel and the population around the site, as well as the status of the environment as a whole.

Technically, the monitoring system will incorporate the facilities (local, mobile, and stand-alone) for the acquisition, transmission, and analysis of weather/hydrogeological data

Conducting an inspection of the condition of the CA





Valery Nazarov

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“NEW ACTIONS BY THE CREATIVE GREEN CROSS: SEARCHING FOR A WAY TO SOLVE THE PROBLEM”



In 1989, when the outraged community of Chapayevsk, Samara region, prevented a chemical weapons (CW) destruction facility from being built, chemical disarmament in our country had reached a breakdown point. Old principles of secrecy were no longer satisfying these people, who now were prepared to fight for their right to know whether it was safe to live next to such a facility. For the first time, the intentions of the government had run up against the powerful opposition of the public. On the surface, the problem appeared to call for substantial changes in the mentality of both the population and the government. At the same time, it was becoming clear that a huge number of chemical munitions were aging and had begun to leak.

In 1994, when the government of Russia issued a resolution to begin preparing for the construction of a chemical weapons destruction facility at one of its seven storage sites (at the Gorny settlement in the Samara region), the situation was almost volatile. The proponents of a radical “for justice” fight were spreading their ideology that the military was on the loose and that a factory would be built without having first performed an ecological review. Preferring to inflame the atmosphere of “no confidence in the actions of the authorities,” these proponents initially declared that Russia possessed not 40,000 tons of chemical agents but 10 times more than that amount. Much time and effort were spent by international experts before it was confirmed that Russia’s stockpiles corresponded to the initially declared figures. To this confirmation, the response of the supporters of chemical safety was: “Ah, if they didn’t find it that means it was well hidden.” These kinds of statements were followed by declarations that Russia was not prepared for chemical weapons destruction because it lacked the necessary technology and that people would have to be resettled to other places. Each of these statements required a denial by the authorities and the government and an explanation of the actual state of affairs. And it appeared that the opposition had succeeded in achieving its goal! They were convinced that these tactics were conducive to making reasonable decisions in their attempt to ensure the adequate safety of the people. But they were ignoring the fact that, for each of these conflicts, these selfsame people were only succeeding in producing a chronic fear of “chemistry,” depression, and apathy.

Common sense suggests that there are better ways of achieving similar results with regard to human safety. One is through cooperation—an attempt to unite and solve the problem by a common effort. Such a constructively minded approach forms a distinctive feature of the ecological researchers working for the Green Cross, which suggested—for the first time—the idea of creating an open discussion of all issues of chemical weapons destruction: on the one side, the population and the public ecological movements; on the other side, the authorities and agencies.

The participants in the public hearings needed time to be convinced that this form of dialogue would be helpful in arriving at a conclusion acceptable to all. New information on which to base decisions had to be made available to all: the general population, the lawmakers, all levels of the administration, scientists concerned with the problem of chemical disarmament, the press, and representatives of all governments involved in the chemical disarmament program. After the Saratov hearings in 1995, local and regional publications began featuring analytical materials instead of emotional appeals.

In 1996, when the chemical disarmament hearings took place in Udmurtia, the local communities and administrations of Kizner and Kambarka (which have CW storage sites) provided their support and suggested specific amendments to the law on CW destruction. These amendments were adopted by the State Duma and the Federation Council, and they were signed by the President.

Gradually, the general attitude toward the CW problem has changed. Many people are beginning to understand that the development of the area’s infrastructure would create changes for the better—offering new jobs, gas in the pipeline (eventually), new water mains, roads, etc. Whereas several years ago people were against building the factory and demanding that chemical weapons be moved away from their communities, these same people are now able to state their demands reasonably, and they are insisting on their right to be heard.

The following point of view is held by the Vice President of Russia’s Green Cross, Mr. S.I. Baranovsky:

We, as ecological scientists who have united in a public organization, are aiming at providing, as much as possible, the objective data and, thus, are helping to promote the ecological education of the entire population of all ages and walks of life. Of particular importance for us are, first, a professional approach and, second, specific practical steps. We are involved in publishing reference materials for the population on various aspects of chemical disarmament and on conducting field research, including an evaluation of the public health around CW storage facilities, training medical personnel from the CWD (chemical weapons destruction) areas, preparing a comparative analysis of the risks involved in CW storage and destruction, etc. Last year, while opening the third round of public hearings in the Kurgan region, I stressed the two-way nature of the education process. Therefore, at the hearings, I am always calling on the participants for cooperation rather than confrontation. I know that any decision always involves a difficult, very difficult tradeoff. Without cooperation, there are no steps forward, although the objective, I believe, is common to all: destroy chemical weapons in a way that is safe for the population in Russia.

Last year at Kurgan and Shchuch’ye, the Green Cross sponsored the opening of Information Centers for the general population. This was not an insignificant event; in several years, Shchuch’ye will host a facility for the destruction of 5,000 tons of chemical agents that are stored at Planovy, outside of Shchuch’ye. The opening of the center was met with understanding and support by both the population and the client (the RF MOD). However, innumerable questions remain unanswered about the safe destruction of chemical agents; for instance, how do we set up a new notification system for emergencies, how is each resident going to be provided with an individual protection kit, and how are hospitals provided with appropriate medicines and instruments for disease diagnostics. Regrettably, each such step requires large amounts of money. Pursuant to this need, the government is assisted by public organizations that are raising money for these purposes. It is very promising that a first step has already been made: providing information and educational assistance. Information Centers offer Green Cross-sponsored booklets dedicated to an individual’s personal safety techniques in case of an emergency, safe CWD technologies, the CWD law, and medical reviews of public health in the region. It would be even better if progress-minded international activists joined the process of chemical disarmament in our country after seeing—in the destruction of chemical weapons—the global safety of mankind and the creation of better living conditions for current and future generations.



The fourth public hearing on the problem of chemical weapons destruction



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